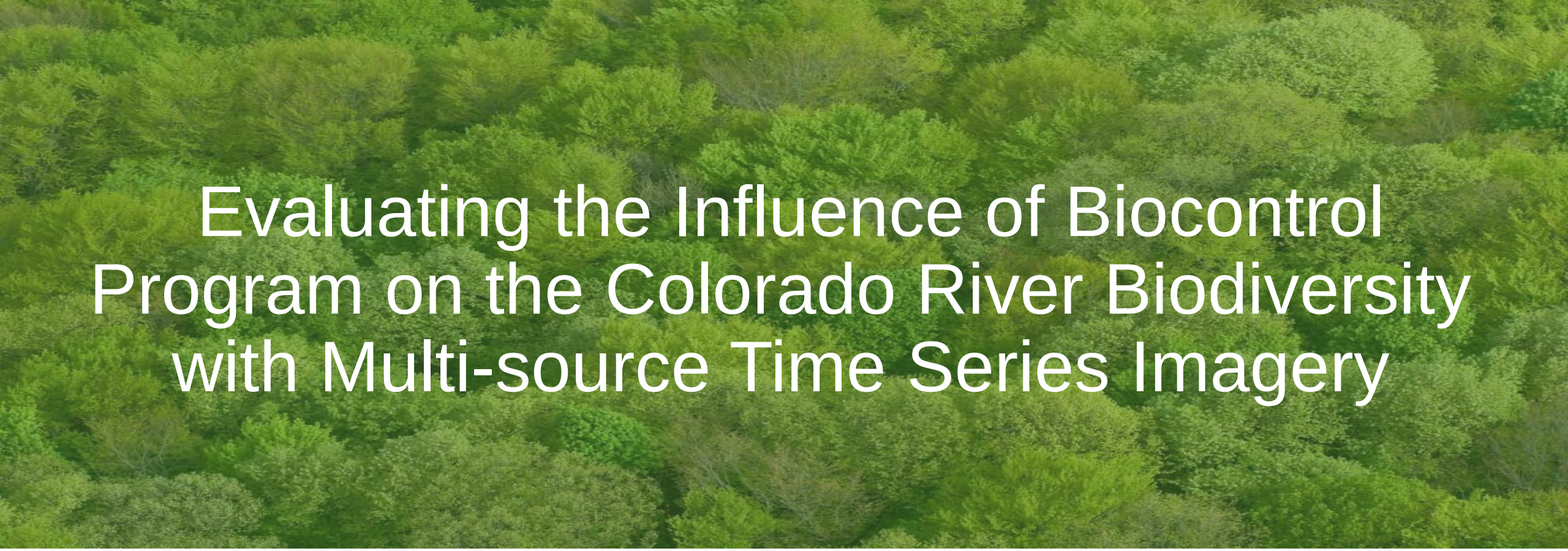

Evaluating the Influence of Biocontrol Program on the Colorado River Biodiversity with Multi-source Time Series Imagery

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05/09/2023

ILLINOIS

Invasion of Saltcedar (*Tamarix* spp.)

- Exotic species is the second most common driver that causes the extinction of native species.
- Saltcedar (*Tamarix* spp.):
  - Initially introduced from Southern Europe or the Eastern Mediterranean region in 1823
  - Provide windbreaks and shade, stabilize eroding stream banks, and serve as ornamental shrubs or trees
  - 8 introduced species, 5 present in the southwest and most species are being considered invasive weeds.
- Impacts of saltcedar:
  - Increase flooding and erosion
  - Increase fire frequency
  - Decrease soil water content
  - Increase soil salinity
  - Out-compete native plant species
  - Decrease diversity of local animal species

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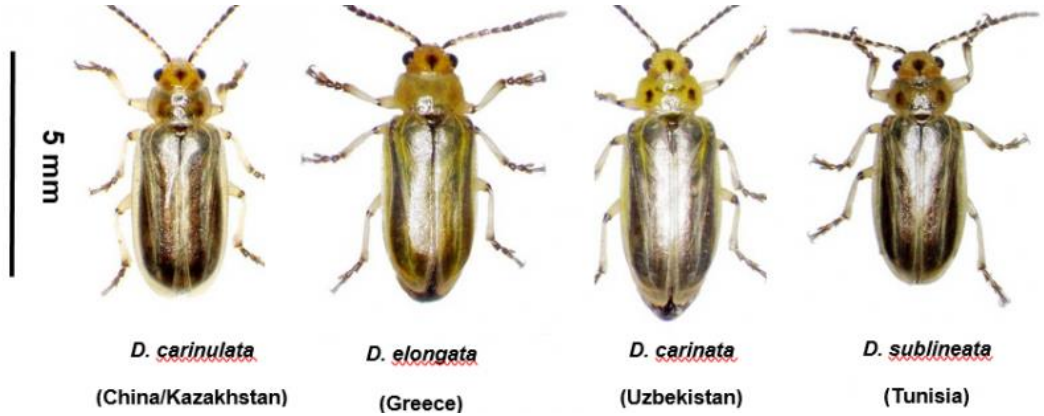
Biocontrol Program

- Northern tamarisk beetles (Diorhabda):
  - Tamarix specific beetles
  - Field release from 2001 to 2010, and still dispersing in 2021
  - Cause 40% tamarisk mortality near release site after five years
  - Decrease the recreational value of bank area
- The extensive effects of the biocontrol program on saltcedar populations and biodiversity remain uncertain.

Bloodworth, B. R., Shafroth, P. B., Sher, A. A., Manners, R. B., Bean, D. W., Johnson, M. J., & Hinojosa-Huerta, O. (2016). Tamarisk beetle (Diorhabda spp.) in the Colorado River basin: synthesis of an expert panel forum. *Grand Junction: Colorado Mesa University Scientific and Technical Report*, (1), 20.



Tracy, J. L., & Robbins, T. O. (2009). Taxonomic revision and biogeography of the Tamarix-feeding Diorhabda elongata (Brullé, 1832) species group (Coleoptera: Chrysomelidae: Galerucinae: Galerucini) and analysis of their potential in biological control of Tamarisk. *Zootaxa*, 2101(1), 1-152.

Project Objectives

- Detect Tamarix defoliation and vegetation regrowth timing at Tamarisk beetles observed and surrounding areas with the Continuous monitoring of Land Disturbance (COLD) model (Fall 2022 – Summer 2023).
- Evaluate local and landscape biodiversity (α-and γ-diversity) change caused by the biocontrol program with convolutional autoencoder (CAE)-based time series clustering (Fall 2023 – Summer 2024).
- Investigate the effects of pre-biocontrol biodiversity, soil water content, and soil salinity on biodiversity change (Fall 2024 – Spring 2025).

Acknowledgement

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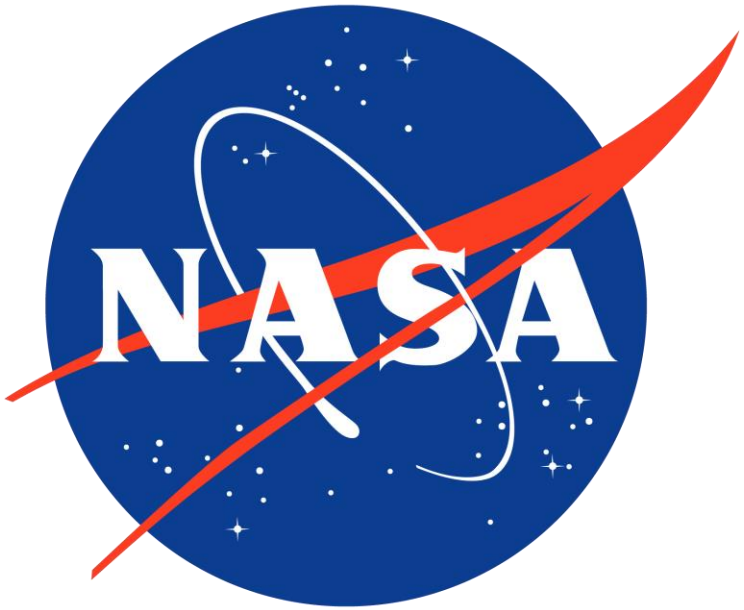

Thank you!

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